

What is claimed is:

1. A method for transcoding progressive I-slice refreshed MPEG data streams to enable trick play mode features on a television appliance, comprising the steps of:

receiving at the appliance a progressive I-slice refreshed MPEG data stream having I-slices distributed over multiple P-frames;

decoding the P-frames to recover the I-slices which make up a complete I-frame;

assembling the recovered I-slices into a complete I-frame;

encoding the complete I-frame;

replacing a selected P-frame in the MPEG data stream with the encoded I-frame to provide an I-frame based MPEG data stream; and

storing the I-frame based MPEG data stream for trick play mode use.

2. A method in accordance with claim 1, comprising:

storing each recovered I-slice in memory as each P-frame is decoded until all I-slices required to assemble a complete I-frame are recovered from the decoded P-frames.

3. A method in accordance with claim 1, comprising:

storing the received progressive I-slice refreshed MPEG data stream.

4. A method in accordance with claim 1, wherein the I-frame based data stream is stored on one of a personal versatile recorder (PVR), a digital video recorder, a set-top terminal, a digital television, or a personal computer.

5. A method in accordance with claim 1, wherein:

a number N of P-frames are decoded to recover the I-slices which make up the complete I-frame; and

the encoded I-frame is inserted into the MPEG data stream in place of Nth P-frame.

6. A method in accordance with claim 5, wherein:

one or more additional P frames are decoded to recover additional I-slices;

the additional I-slices allow assembly of additional complete I-frames; and

said additional complete I-frames are insertable after encoding into the MPEG data stream at a programmable rate.

7. A method in accordance with claim 1, comprising:

inserting additional I-frames into the I-frame based data stream at a programmable interval.

8. A method in accordance with claim 1, wherein the encoded I-frame replaces the selected P-frame at least once per refresh cycle.

9. A method in accordance with claim 1, wherein the trick play mode features comprise at least one of pause, scan forward, scan backward, jump, and still frame display.

10. A method in accordance with claim 1, comprising:

determining whether the data stream is an I-frame based MPEG data stream or a progressive I-slice refreshed MPEG data stream, such that, in the event that the data stream is an I-frame based MPEG data stream, the data stream is stored for trick play mode use without further processing.

11. A method in accordance with claim 1, comprising:

determining whether the data stream is an I-frame based MPEG data stream or a progressive I-slice refreshed MPEG data stream; and

in the event that the data stream is an I-frame based MPEG data stream, inserting additional I-frames into the data stream prior to storing the data stream for trick play mode use.

12. A method in accordance with claim 1, wherein the television appliance is one of a personal versatile recorder (PVR), a digital video recording device, a set-top terminal, a digital television, or a personal computer.

13. A method in accordance with claim 1, wherein:

the P-frames are re-encoded using motion estimation techniques in order to remove the I-slices.

14. A television appliance capable of transcoding progressive I-slice refreshed MPEG data streams to enable trick play mode features, comprising:

a receiver for receiving a progressive I-slice refreshed MPEG data stream having I-slices distributed over multiple P-frames;

a decoder for decoding the P-frames to recover the I-slices which make up a complete I-frame;

a processor associated with the decoder for assembling the recovered I-slices into a complete I-frame;

an encoder for encoding the complete I-frame; and

a multiplexer for replacing a selected P-frame in the MPEG data stream with the encoded I-frame to provide an encoded I-frame based MPEG stream;

wherein:

said I-frame based data MPEG stream is stored on a storage device for trick play mode use.

15. An appliance in accordance with claim 14, comprising:

memory for storing each recovered I-slice as each P-frame is decoded until all I-slices required to assemble a complete I-frame are recovered from the decoded P-frames.

16. An appliance in accordance with claim 14, comprising:

memory for storing the received progressive I-slice refreshed MPEG data stream.

17. An appliance in accordance with claim 14, comprising said storage device.

18. An appliance in accordance with claim 14, wherein said storage device is external to said television appliance.

19. An appliance in accordance with claim 14, wherein:

a number N of P-frames are decoded to recover the complete I-frame; and  
the encoded I-frame replaces the Nth P-frame.

20. An appliance in accordance with claim 19, wherein:

one or more additional P frames are decoded to recover additional I-slices;  
the additional I-slices allow assembly of additional complete I-frames; and  
said additional complete I-frames are insertable after encoding into the MPEG data stream at a programmable rate.

21. An appliance in accordance with claim 14, wherein:

additional I-frames are inserted into the I-frame based data stream at a programmable interval.

22. An appliance in accordance with claim 14, wherein the encoded I-frame replaces the selected P-frame at least once per refresh cycle.

23. An appliance in accordance with claim 14, wherein the trick play mode features comprise at least one of pause, scan forward, scan backward, jump, and still frame display.

24. An appliance in accordance with claim 14, wherein the receiver determines whether the data stream is an I-frame based MPEG data stream or a progressive I-slice refreshed MPEG data stream, such that, in the event that the data stream is an I-frame based MPEG data stream, the data stream is stored in the storage device for trick play mode use without further processing.

25. An appliance in accordance with claim 14, wherein:

the receiver determines whether the data stream is an I-frame based MPEG data stream or a progressive I-slice refreshed MPEG data stream; and

in the event that the data stream is an I-frame based MPEG data stream, the processor inserts additional I-frames into the data stream prior to storage of the data stream for trick play mode use.

26. An appliance in accordance with claim 14, wherein the appliance is one of a personal versatile recorder (PVR), a digital video recording device, a set-top terminal, a digital television, or a personal computer.

27. An appliance in accordance with claim 14, wherein:

the encoder re-encodes the P-frames using motion estimation techniques in order to remove the I-slices.

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